

CARLETON COLLEGE

NORTHFIELD, MINNESOTA

55057

July 25, 1984

DEPARTMENT OF PHYSICS AND ASTRONOMY

To: Station News Directors

From: Barry M. Casper, Professor of Physics

Re: Tape entitled "Nuclear Destruction: From Hirshima to Today," for
broadcast August 6

Enclosed is a short, dramatic and educational piece to consider airing on your station on Monday, August 6, the 39th anniversary of the dropping of the atomic bomb on Hiroshima. It is based on what many speakers concerned with nuclear war education consider to be the most effective and unforgettable demonstration of how very far we and the Soviets have come in building up nuclear arsenals since Hiroshima. As national director of the Federation of American Scientists' Nuclear War Education Project, I helped to refine and publicize this demonstration, but, as I suggest in the attached Nuclear Times article, it deserves to be heard even more widely. The anniversary of Hiroshima seems a most appropriate time. I believe you would be doing a real public service by playing this tape on August 6. Total running time is 2 minutes, 24 seconds.

For your information, the reverse side of this letter contains the narrative of the tape, a description of how the three sounds were produced and an explanation of the rationale behind them. The attached page contains the Nuclear Times article, background information about Hiroshima and the current U.S. and Soviet strategic nuclear arsenals, and a brief synopsis of my own credentials.

The tape was produced at public radio station WCAL in Northfield, Minnesota, under the direction of Valerie Arganbright, with me as narrator. For more information, please feel free to contact Ms. Arganbright at 507-663-3071 or me at 617-489-2980 (July 30--August 3), 703-538-5488 (August 4--August 6).

Thanks for your consideration of this request. The material on the tape is not copyrighted; you may use it in any way you feel appropriate. If you do use it, I would appreciate any comments you have personally or receive from your listeners.

NOTES ABOUT THE AUDIOTAPE NUCLEAR DESTRUCTION--FROM HIROSHIMA TO TODAY

Accompanied by the narrative below, this demonstration consists of three sounds, all produced by dropping ordinary BB's on a metal plate:

- (1) One BB corresponds to the destructive capability of ten Hiroshima bombs, enough to destroy a large modern city;
- (2) 400 BB's corresponds to the destructive capability of 4000 Hiroshimas, enough to destroy the Soviet Union or the United States as a functioning society according to Pentagon studies of the early 1960's, and twice that calculated to be sufficient to trigger a world-wide "nuclear winter," months of darkness and subfreezing temperatures, according to a study published by Dr. Carl Sagan and his associates in December, 1983;
- (3) 18,700 BB's corresponds to the destructive capability of the 187,000 Hiroshimas in the combined U.S. and Soviet strategic arsenals today.

Narrative

To demonstrate how far we have come in the nuclear arms race since the beginning of the atomic age in 1945, I want you to listen to three sounds, all of which are produced by dropping ordinary BB's on a metal plate.

The only time nuclear weapons have been used on people was in Japan, in August 1945. On August 6, a single B-29 bomber released a single bomb in the morning sky over Hiroshima. In a few seconds, over three square miles of the city were leveled and more than a hundred thousand people lay dead or dying.

The first sound you will hear corresponds to the destructive capability of not one, but ten Hiroshima bombs exploding simultaneously, a blast that would level more than thirty square miles, the size of a large modern city. /first sound/

Since 1945, both the United States and the Soviet Union have assembled enormous arsenals of nuclear weapons far more powerful than the Hiroshima bomb. To put the destructive capability of these arsenals in perspective, you might ask, 'how much is enough?' How much retaliatory threat do we need to deter the Russians from attacking us? Enough to destroy one city? ten? a hundred? More than twenty years ago, when John F. Kennedy was President, Pentagon analysts answered this question. They did computer studies of nuclear destruction to determine what was sure to be enough. They calculated what it would take to destroy the Soviet Union as a functioning society. In units of ten Hiroshimas, this is what they found: /second sound/

The third and final sound corresponds, in the same units, to the combined destructive capability of the U.S. and Soviet nuclear arsenals today. That is, each small sound is ten Hiroshimas and the entire sound represents the destruction that we and the Russians are poised to unleash in a matter of minutes after the signal is given in Moscow or Washington.

Acknowledgements

Thanks to Valerie Arganbright and Marty Pelikan of public radio station WCAL in Northfield, Minnesota. Valerie proposed this project and then directed the taping and edited the tape. Marty's experienced and sensitive ear was of critical importance in getting the BB sounds "just right." Thanks also to Bob Goldman, Anne Becher, Nancy Casper and Ed Sostek for their constructive criticisms and helpful assistance. Finally, thanks to Chet Tchozewski of the Colorado American Friends Service Committee in Denver, who first introduced me to the BB demonstration.

BACKGROUND INFORMATION FOR THE AUDIOTAPE
NUCLEAR DESTRUCTION--FROM HIROSHIMA TO TODAY

About Hiroshima: Very early in the morning on this day 39 years ago (August 6, 1945), three B-29 bombers took off from Tinian, a small island in the middle of the Pacific Ocean. One of them, the Enola Gay, carried a new weapon of unprecedented destructive power, a product of the top-secret Manhattan Project; it had first been tested only three weeks before. It was called the atomic bomb. After six and a half hours, it reached its destination, the Japanese city of Hiroshima. In his highly acclaimed book, The Fate of the Earth, Jonathan Schell described what happened there:

On August 6, 1945, at 8:16 A.M., a fission bomb with a yield of twelve and a half kilotons was detonated about nineteen hundred feet above the central section of Hiroshima. By present-day standards, the bomb was a small one, and in today's arsenals it would be classed among the merely tactical weapons. Nevertheless, it was large enough to transform a city of some three hundred and forty thousand people into hell in the space of a few seconds. "It is no exaggeration," the authors of "Hiroshima and Nagasaki" tell us, "to say that the whole city was ruined instantaneously." In that instant, tens of thousands of people were burned, blasted, and crushed to death.

Other tens of thousands suffered injuries of every description or were doomed to die of radiation sickness. The center of the city was flattened, and every part of the city was damaged. The trunks of bamboo trees as far away as five miles from ground zero—the point on the ground directly under the center of the explosion—were charred. Almost half the trees within a mile and a quarter were knocked down. Windows nearly seventeen miles away were broken. Half an hour after the blast, fires set by the thermal pulse and by the collapse of the buildings began to coalesce into a firestorm, which lasted for six hours. Starting about 9 A.M. and lasting until late afternoon, a "black rain" gener-

ated by the bomb (otherwise, the day was fair) fell on the western portions of the city, carrying radioactive fallout from the blast to the ground. For four hours at midday, a violent whirlwind, born of the strange meteorological conditions produced by the explosion, further devastated the city. The number of people who were killed outright or who died of their injuries over the next three months is estimated to be a hundred and thirty thousand. Sixty-eight per cent of the buildings in the city were either completely destroyed or damaged beyond repair, and the center of the city was turned into a flat, rubble-strewn plain dotted with the ruins of a few of the sturdier buildings.

About U.S. and Soviet Strategic Arsenals Today:

	UNITED STATES			SOVIET UNION		
	Missiles or Bombers	Warheads	Hiroshimas	Missiles or Bombers	Warheads	Hiroshimas
Submarine-Launched Ballistic Missiles	520	4800	13,349	948	2004	17,867
Intercontinental Ballistic Missiles	1052	2152	26,794	1398	6384	88,956
Bombers	347	2588	33,427	156	412	7,650
Total	1919	9540	73,570*	2502	8800	114,473*

* To put these numbers in perspective, only about 4000 Hiroshimas would be required to destroy the United States or the Soviet Union as a functioning society.

About Barry M. Casper:

- Professor of Physics, Carleton College, Northfield, Minnesota, 55057
- Ph.D., Theoretical Physics, Cornell University, 1966
- Recipient of the 1984 American Physical Society Forum on Physics and Society Prize (Washington, D.C., April, 1984)
- National Council, Federation of American Scientists, 1970-73, 1981-84
- National Council, American Physical Society, 1980-83
- National Committee, Nuclear Weapons Freeze Campaign, 1983-84
- Arms Control Fellowships: Harvard University's Center for Science and International Affairs (1975-76); University of Minnesota's Humphrey Institute of Public Affairs (1976-77); Massachusetts Institute of Technology's Program in Science, Technology and Society (1980-81)

Like Caldicott In A Can

With this issue we introduce a new column of practical advice for antinuclear activists. It will report on tactics and activities that have proven successful in the past. We urge you to send us descriptions of organizing and educational strategies that have worked well in your area (care of "Ideas That Work," NUCLEAR TIMES, 298 Fifth Avenue, New York, NY 10001).

The room goes dark. "The sound you are about to hear corresponds to the combined destructive capability of the atomic bombs that destroyed Hiroshima and Nagasaki in August 1945."

Ping.
"The next sound corresponds, in the same units, to the destructive capability of the U.S. and Soviet strategic arsenals today."

Slowly at first, then faster and faster until they become an almost deafening avalanche, 100,000 BBs strike a metal plate. The sound goes on and on and on.

The impact is stunning. It is unforgettable. The response is universal silence. Later, when the lights go up and discussion does begin, comes the inevitable first question: "Why do we need more nuclear weapons?"

You don't need 100,000 BBs for this demonstration; more portable versions have precisely the same effect. One person can easily carry a coffee can holding 20,000 BBs. You can contrast the sound of one BB, equivalent to the 10 "Hiroshimas" that will destroy a medium-sized city, with the sound of 20,000 BBs, equivalent to the superpower arsenals today. The impact of this version is just as powerful as 100,000 BBs.

It's a good idea to begin with a short slide presentation, such as a seven-minute segment of the slide show *STOP vs. START*, that describes how far nuclear weapons have come since Hiroshima and reviews the weapons of the U.S. and Soviet arsenals today, expressing their destructive capabilities in units of "Hiroshimas" (which compare the area destroyed by a modern weapon to the comparable area destroyed by the 12.5 kiloton Hiroshima bomb). The slide show explains that the U.S. and Soviet strategic arsenals together amount to nearly 200,000 Hiroshimas, while only about 4000 Hiroshimas would wipe out all the cities of any

appreciable size in either country.

The beauty of this demonstration is that anyone can do it. The slide show is factual and authoritative; the BBs drive home on a gut level the predicament we are in. You do not have to be a spellbinding speaker to achieve an impact that moves people to act. It is like Helen Caldicott in a can.

As a tool for public education about nuclear war, the BB demonstration is incredibly powerful. I wish every American and every citizen of the Soviet Union could hear it. I have a dream that next August 6 the sound of BBs will be heard from the steps of the U.S. Capitol in Washington, from the steps of all 50 state capitols, and in Moscow as well. In the meantime, I recommend this demonstration highly to anyone who speaks about nuclear war.



The metal sounding board can be the bottom of a metal trash can or a stack of ordinary kitchen pans in a container. BBs can be purchased for about \$1.75 per 1500 at many hardware or sporting goods stores. I use slides 8-42 of the slide show *STOP vs. START*, which can be purchased for \$20 from Nuclear War Graphics Project, 100 Nevada Street, Northfield, Minnesota 55057.

• • •

Powerful as it is, the BB demonstration only suggests the destructive potential of nuclear weapons. Films about the two occasions when nuclear weapons were actually used on people provide a unique link between the abstraction and

the reality of nuclear war.

Many nuclear war educators have found that one especially powerful combination of short films consists of *Hiroshima/Nagasaki, August 1945* and *Pikadon*. *Hiroshima/Nagasaki* contains graphic footage shot by Japanese cameramen in the immediate aftermath of the bombings. *Pikadon*, an animated cartoon made in Japan 35 years later, depicts that August 6 morning at Hiroshima when a scene of children playing and ordinary people going about their everyday lives suddenly became a morning of incredible horror. Viewed together, in less than half an hour, the two films somehow manage to convey both what nuclear war will be like and how it will feel if it happens to us.

If you know what is available and where to get them cheaply, films can be an invaluable asset to nuclear war educators and activists. In this regard, everyone should know of the work of John Dowling and Karen Sayer. Dowling has compiled a computerized, annotated list describing virtually every nuclear war film. This continually updated listing is available from Dowling for \$2 (Physics Department, Mansfield University, Mansfield, Pennsylvania 16933). Sayer, at the University of Michigan, has prepared a list of outlets for these films, including commercial distributors as well as film libraries where they may be rented, often much more cheaply. For instance, her list indicates more than 20 film libraries where *Hiroshima/Nagasaki, August 1945* can be rented for \$10 or less, whereas the commercial distributor charges \$35.

Sayer's list of over 150 films, and an abbreviated version of Dowling's descriptions, are included in the just-published *Organizing Manual: A Guide for Planning Educational Activities on Nuclear War and Arms Control*, available for \$4 from the Union of Concerned Scientists, 26 Church Street, Cambridge, Massachusetts 02238. Several copies of *Pikadon* are available for rental in this country for \$25 from Ron Santoni, Philosophy Department, Denison University, Granville, Ohio, 43023. □

Barry M. Casper is professor of physics at Carleton College in Minnesota and director of the Federation of American Scientists' Nuclear War Education Project.